by 1,000,000, at the distance of 100 feet it will be but 1. It is thus seen that the effects are intensely local, and but comparatively trifling at even short distance."

The wide-spread damage in the Chicago explosion was undoubtedly due, in a much larger degree, to the gunpowder than to the dynamite exploded.

Another fact and deduction relating to the escape of several magazines near the great explosion are quite as misleading, if not as erroneous, as the former ones.

If we are correctly informed, most, if not all, of the magazines nearest the exploded buildings, contained dynamite. Now, it is a fact well known to experts that this material is non-explosive by shock or by fire applied separately, but requires some fulminate combining both concussion and combustion, acting simultaneously, to explode it. Hence, being protected from the fire or combustion of the explosion by the walls of the magazines, and being unsusceptible to the force of the concussion, there is nothing remarkable in the salvation of the adjacent magazines. Even those, if any, which contained gunpowder (that explosive being protected from contact with fire, and remaining inactive) were uninjured for equally scientific reasons.

The article concludes, referring to its statements and deductions, by saying, "These are facts which could not have been exemplified save at much cost and risk, and our government officers and other men of science will, we may be sure, bear them carefully in mind hereafter."

Now, as we have shown that the above statements are not facts, but that the contrary is the real truth, and as the actual facts have been ascertained as well by many of our government officers as by a large number of experts all over the world, we would respectfully suggest to the *Herald*, when it intends to publish another scientific dynamite article, that it secure the services of, or at least submit its facts to, some such expert as General Abbott or Gen. John Newton, both of the U. S. army, whose experience with explosives of every kind has been exhaustive, and thus obtain information that the public can rely on. A. W. G.

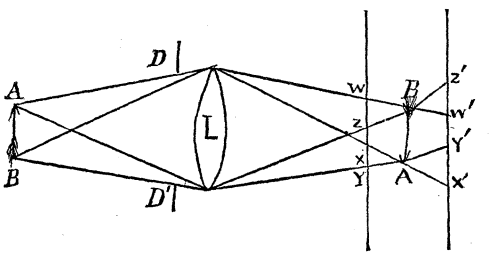
New York, Sept. 1.

On a means of determining the limits of distinct vision.

If an image ($A'B'$) of an object (A B) be thrown on a screen by means of a lens (L, for simplicity supposed free from spherical aberration), and the screen moved forward or backward, the image will be blurred. If part of the rays be stopped by a diaphragm (D D'), this blurring will be less as the aperture of D D' diminishes, for this lessens the spaces (W Z, etc.) over which the rays from any one point of the object are spread on the screen. Now, let the rays be cut off from one side alone; let a curtain (D) descend from above. The upper boundaries (W, X, etc.) of the spaces WZ, XY, etc., will descend, while the lower ones remain stationary. If the object be dark against a brilliant background, the light from above A will be cut off as B descends, and the blurred edge (XY) of the image becomes dark; so that, in the limit, instead of a blurred image (WY), there would be a distinct one (Z Y), or, as the image of D ascends, the image of A B appears to move to meet it, the part near D leading the way, since D intercepts the extreme ray from A before that from B.

If the object be light on a dark ground, the effect will be most apparent on the boundary farthest from D, since the blurred edge that changes to dark is more noticeable than that which changes to light. If the image be formed in front of the screen, making the blurred image Z' X', a little consideration will show that the apparent motion of the image will always be away from the image of D.

These results may be verified with any lens, but are most strikingly shown with the eye, using a sheet



of paper close to the eye as curtain, and any object,—as a pin, pencil, or ruler,—seen against a window or lamp as background. A slit in a piece of paper held against a lamp serves as light object on a dark ground. It is, of course, easy to hold the object so near that it will be blurred; but special effort may be required to blur a distant object, except with near-sighted persons. The applicability of this in making a test of the limits of distinct vision is now apparent. Let a ruler lean against the shade of a lamp; place the eye so near that the image is necessarily blurred, and, moving the edge of a sheet of paper back and forth before the eye, step slowly backward till apparent motion of the object ceases; continue the backward movement until the object begins to recede slightly from the screen: the space where there was no motion is that in which alone distinct vision is possible. Of course, every effort must be made to accommodate the focus of the eye to the object during the whole experiment.

It is a more difficult task than one thinks, to decide by simple judgment whether an object is seen distinctly or not, except it be much blurred. If the image is fairly distinct, most people will suppose it to be perfectly so. The test described above never fails to show whether or not the judgment is correct.

The effect noticed above also adds to the appearance seen when two networks of thread or wire not in the same plane are held before the eye. The watered appearance is of course due to curves which are the loci of the intersections of one set of wires with the other; but these intersections are made noticeable by the fact, that, when two wires not in the same plane and making an acute angle are held before the eye, the nearer acts the part of the curtain D in the above demonstration, and an irregular dark spot is seen about the point where the wires cross. The writer hopes to make a series of experiments as to the limits of distinct vision in different persons, using the test suggested above. Its simplicity, and the absence of any judgment on the part of the person experimented upon, other than as to the direction of motion of the object, commends it to the investigator. ARTHUR E. BOSTWICK.

Montclair, N. J., Aug. 30.